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INTRAVENOUS ADMINISTRATION TO MICE, RATS, AND GUINEA PIGS.

By GEORGE B. ROTH, Pharmacologist, Hygienic Laboratory, United States Public Health Service.

Intravenous administration to small laboratory animals, such as mice, rats, and guinea pigs, although quite easy for the experienced operator, is usually rather difficult for the beginner. This mode of administration has lately taken on a new interest by reason of the fact that it is now employed in the United States for the official biological standardization of arsphenamine and allied compounds.

Intravenous administration as carried out by the Hygienic Laboratory of the United States Public Health Service, either when employing the official method for biologically standardizing arsphenamine or in investigations bearing upon possible modifications in the official method, differs in some respects from the methods commonly employed; and as numerous requests for a description of the several procedures have been received by the Hygienic Laboratory, a somewhat detailed account of them is given here.

White mouse.—The lateral veins of the tail of the white mouse were found to be best suited for intravenous administration purposes. The tail must be free from localized or generalized thickening of the epidermis so as to permit the ready entrance of a No. 23, B. & S. gauge needle. The use of a rather long needle, 1 inch in length, was found to be essential; it does not bend easily and therefore can be directed forward more readily than a smaller one.

A mouse weighing between 15 and 20 grams practically always possesses a soft, pliable tail which can be used without any preparation. When a mouse weighing over 20 grams is used, the lateral veins of the tail are usually covered with rather dense tissue, which precludes their use unless the tail is immersed for about a half minute in warm water (about 50° C.). This procedure both softens the skin and dilates the underlying vessels so that the vessels may be successfully used.

For holding the mouse, a small tin mailing tube attached to an iron stand is employed. One end of the metal mailing tube is fitted with a cork having at the circumference a V-shaped opening, which will admit the tail. The other end of the tube contains several small openings for the purpose of admitting air. (See Fig. 1.)

The mouse is grasped by the tail with the thumb and forefinger of the left hand and placed in the above-described metal mailing tube, and the cork is inserted so that the tail protrudes through the V-shaped opening. The tail is now straightened by gentle but firm traction and without twisting. The dorsal vein should then appear above, and each lateral to the left and right, respectively.

The syringe, usually a 1 cubic centimeter, all glass, tuberculin type, graduated to $\frac{1}{100}$ of a cubic centimeter, is balanced between the first and middle fingers of the right hand, as shown in Figure 1, the hand resting on the little finger; the thumb is thus free to operate the piston of the syringe. With the syringe held nearly parallel to the tail, the needle is pushed through the skin over one of the lateral veins (usually the left) and then anteriorly and downward into the vein. If an entrance into the vessel is not effected, either raising or lowering the point of the needle while advancing it further will usually succeed in locating the lumen of the vessel.

White rat.—The official method for standardizing arsphenamine and allied compounds requires that either the right or left saphenous vein of the white rat shall be employed for the intravenous administration of these compounds. At the Hygienic Laboratory, however, the right vein is more frequently employed, and the procedure is essentially as follows: The animal is tied securely by the legs, back downward, to a flat operating board, by means of strings long enough to permit the hind legs to be lifted easily.

The operating board actually used in the Hygienic Laboratory is exceedingly simple, consisting of a piece of flat board having the dimensions 18 inches by 8 inches by 1 inch. At the end of the board to which the head is tied are two glass pegs about 1 inch long, set in at an angle in order to hold the string which is looped over the front legs of the animal. Nails in the other end of the board receive the strings which are looped to the hind legs. (See Fig. 4.)

After shaving the hair over the skin area covering the left saphenous vein, the left foot is grasped between the third and middle fingers of the left hand, and an incision about one-fourth to one-half of an inch long is made about one-fourth of an inch to the left of and parallel to the vein. (See Step 1, Fig. 5.) The skin is then rolled over to the right with the first finger of the left hand by drawing the skin on the back of the leg to the left. (See Step 2, Fig. 5.) This will bring the vessel into view. An assistant then makes compression to dilate the vessel. If a syringe is used, it is preferable to employ a 1 cubic centimeter all-glass tuberculin type, graduated to $\frac{1}{100}$ of a cubic centimeter and fitted with a No. 26 B. & S. gauge needle, five-eighths of an inch in length. The syringe is balanced between the first and middle fingers of the right hand, the hand resting on the little finger; the thumb is thus free to operate the piston of the syringe. The needle is than passed through the fascia and upper surfaces of the muscles, about one-eighth of an inch to the left of the vein and almost parallel to it. Advancing the needle slightly farther, the direction is changed so that the needle will enter the vein from the side. (See Step 3, Fig. 5.) After the injection is made, the skin, which was pulled to the right to permit the vessel to come into view, is released, and this skin flap and the muscles act as effective me-

Public Health Reports, Vol. 36, No. 13, April 1, 1921.

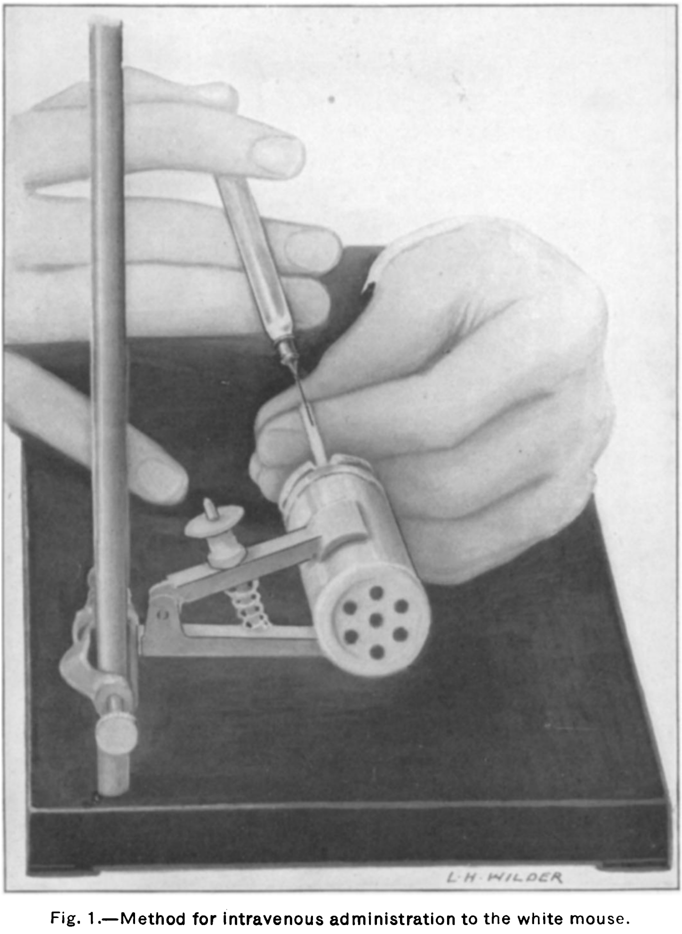

Fig. 1.—Method for intravenous administration to the white mouse.

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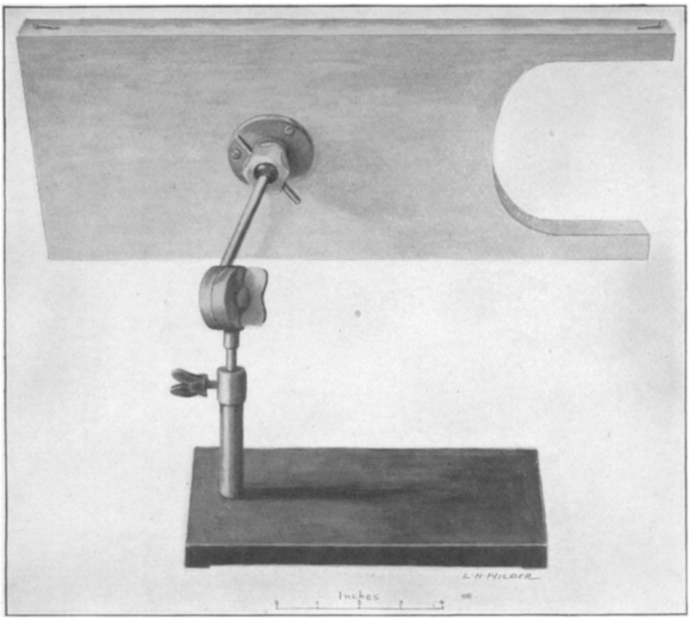

Fig. 2.—Operating board used for intravenous administration to the guinea pig.

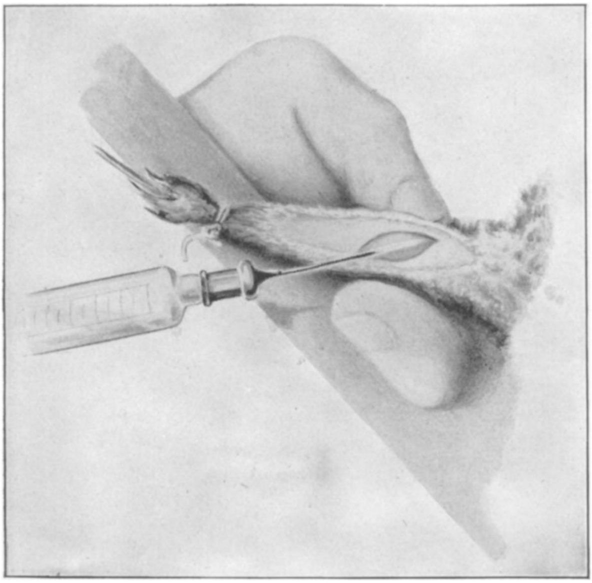

Fig. 3.—Position of vein used for intravenous administration to the guinea pig.

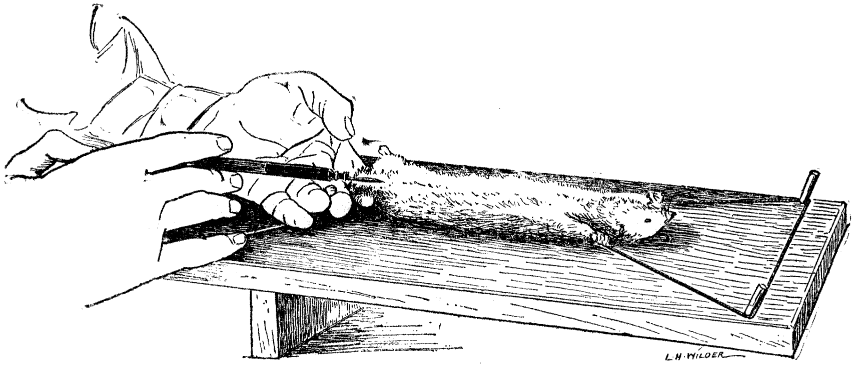

FIG. 4.—Method for intravenous administration to the white rat.

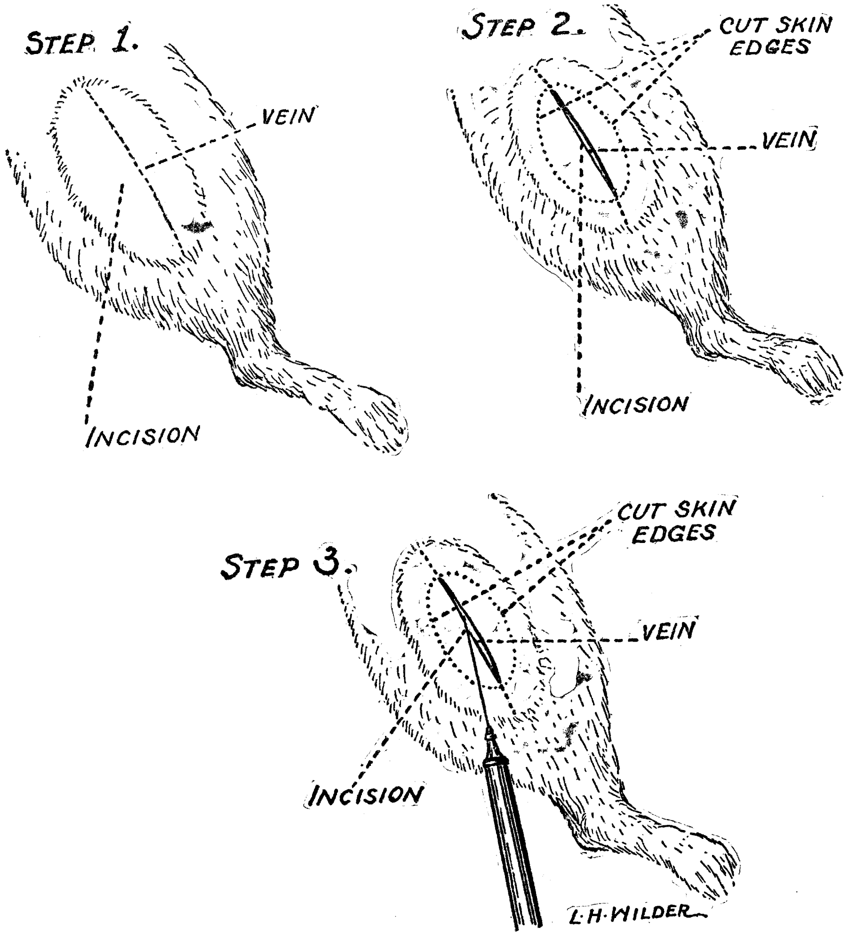

FIG. 5.—The three steps employed for intravenous administration to the white rat.

chanical checks to hemorrhage, which is quite profuse if the needle is inserted directly into the vein.

If a burette is employed and the injection made by gravity instead of by means of a syringe, a flexible rubber tube is attached to the burette, while the other end of the tube carries a glass tube which is drawn out and ground to fit a No. 23 B. & S. gauge needle 1 inch long. The glass tube is handled in the same way as the syringe, and the vessel is entered in the same manner as was described under the syringe method.

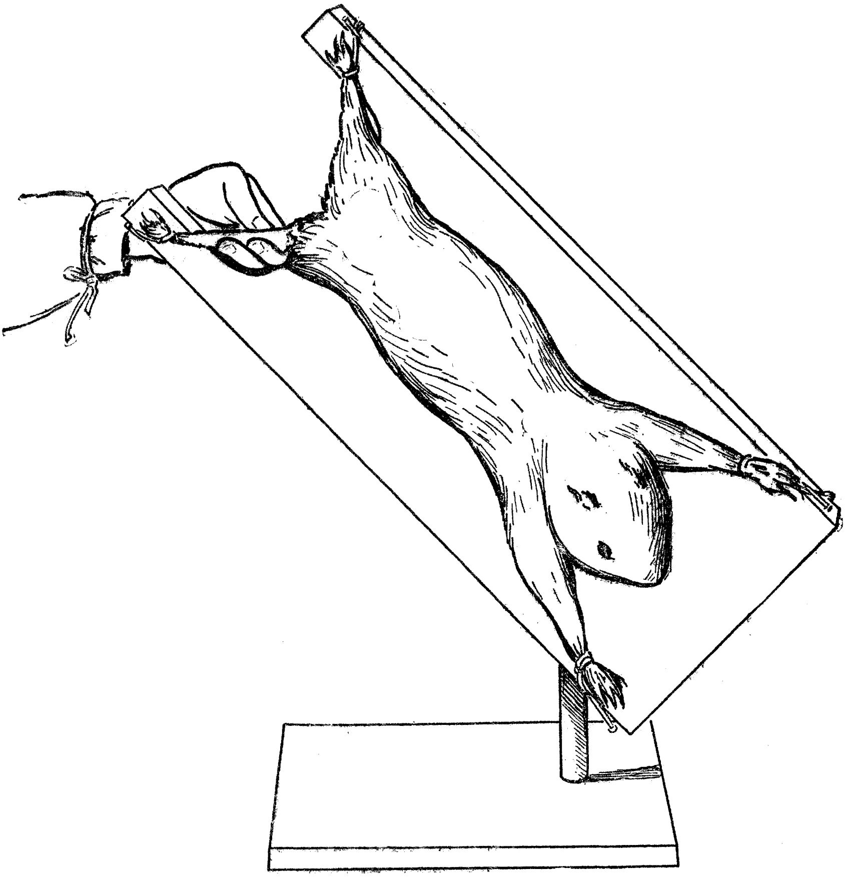

FIG. 6.—Method for intravenous administration to the guinea pig.

Guinea pig.—The large superficial vein lying on the dorsal and inner aspect of the hind leg of the guinea pig is well adapted for intravenous administration. Occasionally, however, the vessel may run anteriorly. To use the above-described vessel for intravenous administration a special operating board is required. The board proper is similar to an ordinary animal board, except that the end to which the hind legs of the animal are tied has a U-shaped piece cut from it as shown in the illustration. (Fig. 2.) The board is mounted near the center on an extension shaft which is fitted with two joints, the one at the end to which the board is attached being a ball-and-socket joint and the other an adjustable swivel joint. The shaft is screwed into a metal base which has sufficient weight to hold the board steady when placed in any position.

The procedure for making the injection is as follows: With the board properly placed in a horizontal position, the animal is tied to it securely, abdomen downward, by means of strings. The board is then placed in a vertical position and rotated on its vertical axis slightly so as to bring the dorsal aspect of the right hind leg into view. After clipping the hair from the leg and shaving it, the leg is lifted up slightly by the first or first and second fingers and the vein dilated by suitable compression. (Fig. 6.) The vessel can now usually be seen through the skin. A small incision, usually about one-fourth of an inch long, is made diagonally across the leg from the outer lower to the upper and inner aspect, but a trifle to the left of the vessel. The subcutaneous tissue is then pushed aside with a fine pointed forceps, thereby permitting the vessel to come into view.

The vessel is then entered directly (Fig. 3) or in the same manner as has been described for the rat—that is, by passing the needle of the tuberculin syringe through the fascia and muscles to the left of the vessel and then entering the vessel from the side. The vessel when dilated permits the ready entrance of a No. 23 B. & S. gauge needle. However, the needle usually employed is a No. 26 B. & S. gauge, five-eighths of an inch in length. The needle is always introduced well into the lumen of the vein. If entrance into the vessel is direct, subsequent hemorrhage may be controlled readily by pinching it with a small forceps.

PRELIMINARY NOTE ON A STABLE SILVER VITAMINE COMPOUND OBTAINED FROM BREWER'S YEAST.

By Atherton Seidell, Technical Assistant, United States Public Health Service.

Since the discovery in 1915[1] that fullers' earth possesses a remarkable adsorptive power for vitamine, the product resulting from this attraction has been used by me as the starting point for all subsequent attempts to isolate a pure, stable, antineuritic compound. The vitamine-fullers' earth combination has, for convenience, been designated as "activated" fullers' earth, and a large quantity of it was prepared and carefully standardized for its antineuritic power by tests on pigeons. Repeated tests on some of the samples showed that no loss of activity occurred during a period of more than five years. Until recently all of the attempts to obtain a pure vitamine

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[1] Seidell, Atherton, "A Stable Form of Vitamine, etc.": Public Health Reports, *31*, 364–370, Feb. 18, 1916.